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## Effectiveness of Student Teams Achievement Division (STAD) Cooperative Learning Model on Student Learning Outcomes

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### Article Info

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### Abstract

This study aims to determine whether the STAD cooperative learning model is more effectively applied than the conventional learning model of student mathematics learning outcomes. This type of research is quasi-experimental research. The population of this study was all students of class X in SMK Piri 2 Yogyakarta, with a sample of class X in the Department of Clothing as many as 15 students as an experimental class and majors X of DKV as many as 15 students as the control class. Data collection techniques are observation, documentation and test techniques. The data analysis technique used is descriptive analysis, initial balance test, prerequisite test and hypothesis test. The results of the study concluded that using the STAD cooperative learning model was more effective than the conventional learning model, it can be seen from the completeness of the experimental class with a mean of 83.67 greater than the control class with a mean of 67.33. Thus the STAD cooperative learning model can be used as an alternative to improving student mathematics learning outcomes.

**Keywords:** *Effectiveness, Student Teams Achievement Division, Learning Model, Learning Outcomes*

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## Introduction

Education is one of the most important aspects in human life, especially its relation to the progress of a nation. The teacher is responsible for teaching and learning activities. For this reason, the teacher who acts as the facilitator must be able to create conditions that allow for a good interaction process with students, so that students can carry out various learning activities effectively. According to Dimiyati and Mudjiono (2009) learning activeness is a process of active student learning activities both intellectually and emotionally, so that students appear to actively participate in doing activities and have the drive to make something and have their own will and aspirations. The activeness of students in learning activities can help the mindset and understanding of the students themselves, so that student learning outcomes will also improve.

Education has become a necessity of the people who increasingly feel important. One area of study that has an important role in education is mathematics. Mathematics is one of the fields of study that needs to be studied because the nature of mathematics is an understanding of the patterns of change that occur in the real world and in the human mind and the relationship between these patterns holistically (Martini, 2014).

Mathematics requires an understanding of high thinking power and to date mathematics education is still an unattractive subject for most students. In this case a number of problems were found by the teachers when the mathematics learning process took place which caused not all students to have maximum learning outcomes. In the learning process the teacher still found it difficult to condition the class and actively involve the students, it appears that many students did not pay attention by doing own activities in the classroom such as playing with friends, playing mobile phones, sleeping, listening to music, eating, and even having permission to leave the classroom for various reasons. This happens because the methods or approaches and instructional media used by teachers are still less varied so students tend to lack enthusiasm when attending lessons because the learning process is still teacher centered.

Based on observations by researchers at SMK PIRI 2 Yogyakarta, especially in class X, the results of the mid term mathematics test results of students are still below the Minimum Mastery Criteria (KKM) that has been set, namely 75.

To overcome these problems, the teacher needs to use an interesting learning model so that learning can increase the activity and motivate students in learning mathematics. If students are active in learning, it is very possible that students' mathematics learning outcomes will also improve. In order to improve and maximize student mathematics learning outcomes, development of cooperative learning models is needed. Cooperative learning is a form of learning by means of students learning and working in small groups collaboratively, whose members consist of 4 to 6 people, with a heterogeneous group structure (Abdul Majid, 2013). In the cooperative model, the teacher sometimes acts as a counselor, consultant, and sometimes also as a friendly giver of criticism (Miftahul Huda, 2013). One such learning model is the Student Teams Achievement Division (STAD). According to Slavin (2005) cooperative learning model type Student Teams Achievement Division (STAD), students are divided into learning teams consisting of four to five people who vary in their abilities, gender, and ethnic background. The teacher presents the subject matter, then students work in their team to ensure that all team member have mastered the lesson.

Based on the description above, researchers are interested in conducting research with the title "Effectiveness of Student Teams Achievement Division (STAD) Cooperative Learning Model Against Mathematics Learning Outcomes of Class X Students of SMK Piri 2 Yogyakarta 2018/2019 Academic Year". Thus it is hoped that the Student Teams Achievement Division (STAD) cooperative learning model can improve student learning outcomes and existing problems can be overcome. The purpose of this study are (1) To find out the tendency of mathematics learning outcomes for students of class X in SMK PIRI 2 Yogyakarta whose learning uses the Student Teams Achievement Division (STAD) learning model, (2) To find out the tendency of mathematics learning outcomes in class X SMK PIRI 2 Yogyakarta students learning using conventional learning models, (3) To find out whether the Student Teams Achievement Division (STAD) learning model is more effective than conventional learning models in improving mathematics learning outcomes of students of class X SMK PIRI 2 Yogyakarta.

## Method

This research was conducted at SMK Piri 2 Yogyakarta with research subjects in class X Clothing Design and class X DKV semester 2 of the 2018/2019 school year. This type of research used in this study is quasi experimental research (quasi experimental research). The variables in this study are the independent variables and the dependent variable. The independent variable is the STAD (Student Teams Achievement Division) learning model as an experimental group and Conventional learning as a control group. While the dependent variable is student mathematics learning outcomes.

The population in this study were all students of class X SMK PIRI 2 Yogyakarta, namely class X majoring in DKV, class X majoring in TKJ, and class X majoring in TB. The sampling technique uses purposive sampling technique. From class X, two sample classes were taken, namely class X TB as an experimental class of 15 students and class X DKV as a control class of 15 students. The experimental class was treated using the method STAD and control class were given treatment using conventional learning.

Data collection techniques used in this study were observation techniques, test techniques, and documentation techniques. Observation technique was carried out to find out whether the mathematics learning process and its implementation were in accordance with the Student Teams Achievement Division (STAD) cooperative learning model. The test technique is used to obtain data on student mathematics learning outcomes in Student Teams Achievement Division (STAD) cooperative learning and conventional learning models, by holding a post test. While the documentation technique is used to collect data during the study. The documentation in this study was obtained from the value documents owned by the teacher who teaches mathematics class X in SMK PIRI 2 Yogyakarta. This value is taken from the results of the UTS even semester semester 2018/2019 as the initial ability value. The data analysis technique used hypothesis testing which was preceded by a prerequisite test.

## Results and Discussion

### Prerequisite Test

Prerequisite test data analysis performed to determine whether the data collected meets the requirements for further analysis or not. Data analysis prerequisites include normality tests and homogeneity tests. Normality test

is used to find out data taken from populations that have normal distribution or not. Calculations used in the normality test with the Liliefors Test. The criterion in the test is that the sample comes from a normal distribution population if the statistical value in each sample is not in the critical area or  $L_{count} < L_{table}$ . The summary of test results data normality learning outcomes can read in Table 1.

Normality Test	N	$L_{count}$	$L_{table}$	Decision	Conclusion
Experiment	15	0,203	0,220	$H_0$ is accepted	Normal
Control	15	0,161	0,220	$H_0$ is accepted	Normal

Based on the data in the table it can be seen that  $L_{count} < L_{table}$ , so it can be concluded that each sample comes from a normally distributed population.

After knowing the learning outcomes data are normally distributed then the homogeneity test is continued. Chi squared testing criteria ie the population is said to have the same or homogeneous variance if the value of  $\chi^2_{count} < \chi^2_{table}$ . The summary of homogeneity test in mathematics learning outcomes can read in Table 2.

Class	N	$\chi^2_{count}$	$\chi^2_{table}$
Experiment	15	0.458	3,841
Control	15		

From the calculation of  $\chi^2_{count} = 0.458$  with  $\chi^2_{table} = 3.841$ . Because  $\chi^2_{count} < \chi^2_{table}$  that is  $0.458 < 3.841$ , so it can be concluded that the two classes namely the experimental class and the control class have the same or homogeneous variance.

### Hypothesis Test

Hypothesis test is done to answer from the submission of the hypothesis that the Cooperative Student Teams Achievement Division (STAD) learning model is more effective than the conventional learning model of the mathematics learning outcomes of Grade X students of SMK Piri 2 Yogyakarta. The calculation is done in hypothesis testing using the t test, the following results are obtained in Table 3.

Class	N	$\bar{X}$	$S_p$	$t_{count}$
Experiment	15	83,67	21,767	2,055
Control	15	67,33		

From the calculation results  $|t_{count}| = 2.055$  with  $t_{table(0,05;28)} = 2.048$ . Because  $|t_{count}| > t_{table}$ , it can be concluded that there is a significant difference between the classes using the Cooperative Student Teams Achievement Division (STAD) learning model and the classes using conventional learning models.

The experimental class whose learning uses the Student Teams Achievement Division (STAD) cooperative learning model has an average of 83.67 while the control class which uses conventional learning models has an average of 67.33. Based on calculations, the level of effectiveness using the Student Teams Achievement Division (STAD) cooperative learning model is more effective than conventional learning on student mathematics learning outcomes.

From this study the results of hypothesis testing using the t test with  $t_{count}$  of 2.055, while t table with a significance level of 5% with  $dk = (n_e + n_k - 2) = 28$ . Because  $|t_{count}| > t_{table}$ . So it can be concluded that the use of the Student Teams Achievement Division (STAD) cooperative learning model is more effective than the conventional learning model of the mathematics learning outcomes of Grade X students of SMK Piri 2 Yogyakarta.

The results of this study also support several previous studies, namely from Tatik Sugesti (2015) entitled "The Effectiveness of Student Teams Achievement Division (STAD) Cooperative Learning Models on Mathematics Learning Achievement of Class VII Students of SMP N Sewon Bantul". The results of his study showed that the Student Teams Achievement Division (STAD) cooperative learning model was more effective than using a direct learning model for students' mathematics learning achievement. Research conducted by Febriana Irwanti &

Benedictus Kusmanto (2017) entitled "The Effectiveness of the STAD (Student Teams Achievement Division) Cooperative Learning Model Against Mathematics Learning Outcomes Viewed from the Learning Interest of Class VII Students in Piri Sleman Junior High School. The results showed the STAD learning model was more effective than the conventional learning model. There are similarities from previous studies with this research that is using STAD learning models, then the methods used are experimental research. While the difference from previous research with this research is at the level of the education unit studied, in the class studied, and this study does not use in terms of learning interest and in terms of learning styles.

## Conclusion

Based on the research that has been done, it can be concluded that:

1. The tendency of mathematics learning outcomes for class X students of Piri 2 Yogyakarta Vocational School in 2018/2019 for learning using the Student Teams Achievement Division (STAD) cooperative learning model obtained an average value of 83.67 including in the very high category.
2. The tendency of mathematics learning outcomes for class X students of Piri 2 Yogyakarta Vocational School 2018/2019 for learning using conventional learning models obtained an average value of 67.33 including in the high category.
3. The Student Teams Achievement Division (STAD) cooperative learning model is more effective than the conventional learning model of the mathematics learning outcomes of class X students of SMK Piri 2 Yogyakarta in the academic year 2018/2019.

## Recommendations

Researchers have several suggestions, namely: (1) teachers can use the STAD cooperative learning model as a material consideration in an effort to improve student mathematics learning outcomes at school; (2) in the learning process, teachers must be able to provide motivation and direction to students to always play an active role in an orderly manner; (3) for researchers who will conduct similar research, it takes careful planning and preparation so that the results obtained can be maximized as expected.

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